REMARKS

In the Office Action dated December 13, 2002 the Examiner (1) required submission of certified copies of the foreign patent documents from which priority is claimed under 35 U.S.C. 119(a)(d); (2) noted the draftsperson's objections to the drawings; (3) rejected certain claims under 35 U.S.C. § 112, first paragraph; (4) rejected certain claims under 35 U.S.C. § 112, second paragraph; and (5) rejected all claims under 35 U.S.C. § 102(b) as anticipated, variously, by *Russel*, *Taubman et al.*, *Gristina et al.* or *Lehner et al.*

Priority Documents

In response to the requirement for submission of the foreign patent documents from which priority is claimed, certified copies of Canadian Patent No. 2,302,861 and Canadian Patent No. 2,332,733 are enclosed herewith.

Drawings

Eleven (11) sheets of replacement drawings containing Figures 2A-D, Figures 9A-G and Figures 11A-D are submitted concurrently herewith under separate cover letter addressed to the Official Draftsperson.

Amendments to the Specification

The subheading of paragraph [0015] of the specification has been amended to conform with the renumbering of Figure 9, as required by the Official Draftsperson.

Claim Rejections Under 35 USC § 112, First Paragraph

In the Office Action dated December 13, 2002, claims 1-5, 22-28 and 32-33 were rejected under 35 U.S.C. § 112, first paragraph. The Examiner states that claim 1 was rejected as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In reply, this claim has been deleted from the application.

Claims 1, 5, 22-28 and 32-33 (as a vaccine composition only) stand rejected as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In reply, claims 1, 5 and 32-33 have been deleted from the application. With respect to claims and claims 22-28, Applicant respectfully traverses this rejection for at least the reason that, contrary to the Examiner's statement, each of those claims is <u>not</u> drawn to a pharmaceutical

composition or vaccine composition, but is instead directed to an isolated polypeptide having competence signal peptide activity. The 21 amino acid fragment of SEQ ID NO:4 and SEQ ID NO:16 is an example of such a polypeptide. Note that SEQ ID NO:16 is synthetically made, and SEQ ID NO:4 is derived from endogenous CSP It can be readily seen that this CSP-active fragment results from removal of the first 25 amino acids of SEQ ID NO:2. New claims 38 - 42 have been added to describe this and other preferred embodiments. Support for these claims is found at page 5, paragraphs 21-25, and elsewhere in the specification.

The Examiner takes the position with respect to claims 1-5, 22-28 and 32-33 that the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The Examiner states that it is unclear to one skilled in the art what sequences are embraced by the present invention since the specification lacks an algorithm and parameters used to determine percent homology/identity/similarity. The Examiner acknowledges, however, that a compound comprising SEQ ID NO:2 or 4 is enabled by the specification. As discussed above, claims 1-5 and 32-33 have been deleted from the application. With respect to claims 22-28, Applicant respectfully traverses this rejection.

The Applicant asserts that the polypeptides and polypeptide fragments (sequences) of the present invention are sufficiently defined with reference to sequence identity. According to page 14, paragraph 53 of the specification, "[i]dentity refers to the similarity of two peptides or proteins that are aligned so that the highest order match is obtained. Identity is calculated according to methods known in the art, such as the ClustalW program." Based on the disclosure and the knowledge of a person of ordinary skill in the art, it will be apparent to such a person how to make and use the polypeptides and polypeptide fragments characterized by SEQ. ID. NO:2 or 4 by employing the Clustal W algorithm. Once the sequence identity of the sequences embraced by the present invention has been established the conclusion can be drawn that analogous function follows from sequence similarity. Active fragments SEQ ID NO:2 and SEQ ID NO:4 or 16 show that this is the case.

The Examiner states that the problem of predicting protein structure determinations to ascertain functional aspects of the protein and finally what changes can be tolerated with respect thereto is extremely complex and is well outside the realm of routine experimentation. The Applicant directs the Examiner's attention to page 14, paragraph 52 of the disclosure which states "[a] peptide is considered to possess a function substantially equivalent to that of the CSP peptide if it has CSP activity. CSP activity means that it is able to confer genetic competence to *S. mutans*, as measured by an increased ability to incorporate and express foreign genetic material.. CSP activity

also means that the peptide is able to confer an acid tolerance response in *S. mutans* as measured by an increase in cell survival under acidic pH conditions when added to cells". The specific assays for genetic competence and acid tolerance are then described on pages 22 and 23 respectively. In addition, the applicant submits that those skilled in the art will recognize that a variety of techniques are available for constructing variants and peptide mimetics of SEQ. ID. NO 2 and 4 (see for example, Morgan and Gainor, *Ann. Rep. Med. Chem.*, 24:243-252 (1989). The applicant respectfully submits that although some experimentation may be necessary to practice some aspects of the present invention, it is not undue.

Finally, the Applicant asserts that upon reading the application as a whole, it is clear that the polypeptides characterized by SEQ. ID. NO:2, 4 and 16 are examples of the present invention. The wording of the description of the invention does not limit the claimed invention to only those two embodiments (see for example, pages 14 to 16). The polypeptides characterized by SEQ. ID. NO:2 and 4 are only disclosed to illustrate specific embodiments of the invention. New claim 43 is directed to a polypeptide wherein 1 - 15 amino acids of the polypeptide of claim 24 have been modified to include up to 1 point mutation per each 10 amino acids of SEQ ID NO:2 or SEQ ID NO:4, or a portion thereof. New claim 44 requires that each such mutation comprises substitution with another amino acid. As explained above, and in paragraphs 52-60 of the specification, in particular, adequate guidance is provided for one of ordinary skill in the art to prepare polypeptides that are within the scope of the claims. The pending claims are consistent with the USPTO Revised Interim Written Description Guidelines Training Materials (http:/ www.uspto.gov/web/menu/written.pdf), Example 14 (pages 53-55), in particular.

Claim Rejections Under 35 USC § 102(b)

Claims 1-5, 22-28 and 32-33 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,521,513 (*Russel*). As discussed above, claims 1-5, and 32-33 are deleted from the application. With respect to claims 22-28, Applicant traverses this rejection for at least the reason that the antigen C or corresponding antibody described by *Russel* is unlikely to interfere with the interaction of CSP with histidine kinase. The protein described by *Russel* has a molecular weight of 70,000 ± 5000 Da, an isoelectric point (Pi) of 4.45± 0.24 and is isolated from the cell walls of *Streptococcus mutans*. Comparatively, CSP is a very small peptide with a molecular mass of 2364 Da and a Pi of 11.97. Although, the strain Ingbritt used to isolate antigen C is naturally competent, the growth conditions described by *Russel* are not competence inducing, therefore very little CSP should be produced prior to his purification process.

With respect to the rejection of claims 1-5 and 32, the rejection under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,150,116 (*Taubman et al.*) is now moot in view of the cancellation of these claims. Likewise, the rejection of claims 1-2 and 5 over U.S. Patent No. 5,530,102 (*Gristina et al.*) or U.S. Patent No. 6,024,958 (*Lehner et al.*) is also moot.

Accordingly, Applicant believes that all of the pending and new claims distinguish over the cited references and fully comply with the requirements of 35 U.S.C. § 112. Reconsideration and allowance of all claims are respectfully requested.

Conclusion

Applicant may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art, which have yet to be raised, but which may be raised in the future.

Consideration of the foregoing amendments and remarks, reconsideration of the application and withdrawal of the rejections and objections is respectfully requested by Applicant. No new matter is introduced by way of the amendment. It is believed that each ground of rejection raised in the Office Action dated December 13, 2002 has been fully addressed. However, if a telephone conference would facilitate the resolution of any issue, the Examiner is invited to telephone the undersigned at 713-238-8000. Applicant has requested a one-month extension of time and has provided payment in accordance with 37 C.F.R. § 1.17(a)(1). If any additional fee is due as a result of the filing of this paper please appropriately charge such fee to Deposit Account Number 03-2769 of Conley Rose, P.C., Houston, Texas. If a petition for additional extension of time is necessary in order for this paper to be deemed timely filed, please consider this a petition therefor.

Respectfully submitted,

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